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Innovation in Planning of Inclusive University Spaces. A Comparative Study of Psychological Perceptions of Urban and Architectural Typologies Among Students of Creative Disciplines and People with Intellectual Disability

Innovación en la planificación de espacios universitarios inclusivos. Un estudio comparativo de las percepciones psicológicas de las tipologías urbanísticas y arquitectónicas entre estudiantes de disciplinas creativas y personas con discapacidad intelectual

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Abstract

Keywords:
architecture;
fashion;
social inclusion;
intellectual disability

The planning of university spaces is a transcendental action, from which their urban-architectural, functional and experiential improvement arises. Research is a mission called upon to provide guidelines for innovation. The text comprises the results of the R&D Project "Inclusive Campus and Architecture" (Ministry of Science, Innovation and Universities of Spain -PID2020-114373RB-I00), that translate into the genesis of qualitative transformation patterns that are born from the sensitivity of people with intellectual disability. The research process, aimed at providing criteria of excellence in university planning, also promotes the social inclusion of people with ID. The work explores the emotional responses of people with intellectual disability to a range of spatial typologies, adding a comparative study with what was contributed by students from two creative disciplines, such as Fashion and Architecture. In this way, full inclusion is achieved, where applied creativity has acted as a link between the 3 groups surveyed. The result is a series of contrasted criteria to address the requalification of university spaces, so as to increase values such as human scale and welcoming, which contribute to the effective improvement of campuses for any type of community that experiences them.

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Resumen

Palabras clave:
arquitectura;
moda;
inclusión social;
discapacidad intelectual

La planificación de espacios universitarios es una acción trascendental, de la que surge la mejora de su calidad urbanístico-arquitectónica, funcional y vivencial. La investigación es una tarea llamada a proporcionar pautas para la innovación. El texto recoge los resultados del Proyecto de Investigación "Campus Inclusivos y Arquitectura" (Ministerio de Ciencia, Innovación y Universidades de España -PID2020-114373RB-I00), que se traducen a la génesis de patrones cualitativos de transformación que nacen de la sensibilidad de personas con discapacidad intelectual. El proceso de investigación, orientado a proporcionar criterios de excelencia en la planificación universitaria, también promueve la inclusión social de personas con DI. El trabajo explora las respuestas emocionales de personas con discapacidad intelectual a una variedad de tipologías espaciales, agregando un estudio comparativo con lo aportado por estudiantes de dos disciplinas creativas, como Moda y Arquitectura. De esta forma, se consigue la plena inclusión, donde la creatividad aplicada ha actuado como punto de encuentro entre los 3 grupos encuestados. El resultado es una serie de criterios contrastados para abordar la recualificación de espacios universitarios, con el fin de incrementar valores como la escala humana y el acogimiento, que contribuyen al incremento efectivo de la calidad de los campus para cualquier tipo de comunidad que los experimente.



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1. Introduction: university spaces, planning and social inclusion

1.1. *University spaces and planning*

Universities have been building society for more than nine centuries. To accomplish their missions, they must have an outstanding human capital but also rely on the contribution of built spaces. For such support to be technically structured, the best tool is planning, as it brings quality and rigor to the conception and evolution of Architecture (Dober, 1996). The historical progress of physical spaces of universities shows differentiated typologies, which have always accompanied institutional and pedagogical models (Bender, 1988). Furthermore, when devised with a desire for excellence, Architecture has triggered paradigm shifts (Kramer, 2010). The variety of formats can be classified into 3 categories: the university precinct (campus), the architectural piece, and the classroom (Campos, 2017).

Based on this typological arrangement, the developed research has focused on those 3 basic scales, as they are particularly useful in terms of psychological perception and social inclusion. They provide an effective working basis to evaluate the responses of various groups to spatial typologies.

1.2. *On social inclusion*

Institutions of Higher Education must fulfil 3 essential missions: teaching, research and social commitment (Loi, & Di Guardo, 2015). This implies the need to integrate all types of groups, with special sensitivity to those with intellectual disability; the contribution of built places is essential (Foreman, 2008). At the same time, it should be considered that social inclusion in planning continues to generate experiences of interest, the essence of which can be transferred to the scenario of universities (Oliveira, & Carbajal, 2024).

The purpose of social inclusion is to increase the active presence of people with disabilities, such as the intellectual ones (ID), especially in university environments (O'Brien, Bonati, Gadow, & Slee, 2019), (Mock, & Love, 2012). This text presents the outcomes of a research process aimed at encouraging the crystallization of inclusive environments, with specific reference to university campuses (Carothers, Aydin, & Halpern, 2021); and involving as well universal accessibility (Raheja, & Suryawanshi, 2014), (Dotras, & Riera, 2012), (Stephanidis, 2009). Investigation becomes necessary to promote the participation in the planning of architectural typologies that are more welcoming. The latter is one of the foundations of the R&D Project "Inclusive Campus" (Ministry of Science, Innovation and Universities of Spain -PID2020-114373RB-I00), addressed to explore the emotional responses to different spatial typologies. The evaluation of those is finally translated into the formulation of criteria of spatial solutions that promote social inclusion. It is therefore necessary to emphasize that social inclusion is related to Architecture.

1.3. *Planning of university spaces: scales and social inclusion*

Scale: campus. There are links between social profile and campus planning, as certain features of the latter are called to inspire it, fostering integral learning communities (Turner, 1984). The crystallization of these communities constitutes an aspiration of unquestionable inclusive vocation, since the objective is the integration of groups of different social profiles.

Scale: building. The building is the inclusive translation to the architectural composition. Certain typologies have been particularly effective in inducing interpersonal relationships: the cloister (Latin), and the college (Anglo-Saxon). Both were heirs of the monastic archetype, and germ of the North American quadrangle. They respond to a centripetal pattern; whose centre of gravity is an interstitial void. As a delimiting volume, it generates inclusive sensations of protection and shelter, preserving a human scale.

Scale: classroom. Teaching/learning activities reach significant levels of intensity in classrooms. They have great potential as factors for reinforcing students' sense of belonging and, consequently, social inclusion. The experiential richness inherent in the classrooms is related to certain dimensions, such as phenomenological-perceptual and poetic (Canter, 1975). Environmental variables have also been studied, such as shape, lighting, sound, temperature and occupancy, as well as the influence of furniture (Berk, & Goebel, 1987). It is also worth remembering the isomorphisms, as a relationship between the pedagogical modality and the spatial solution.

1.4. Perception and experience of environments

Social inclusion is closely related to the interaction between human beings and the built context, affecting physical and mental well-being, which is achieved by feeling protection, control and identification (Proshansky, Fabian & Kaminoff, 1983), (Brown, 1987).

There are recent precedents on the importance of emotions in planning university urban and architectural elements, (Campos, Wilson, & Turner, 2022). In people with ID, the psychological perception of those elements becomes essential to devise design criteria that promote positive emotions. To assess the results of the research process in a cross-sectional manner, certain theoretical contents will be used later (Piaget, 1954).

Piaget conceives space as a projection from the body, which expands consciously over the environment, establishing three typologies: euclidean, topological and projective (Marjanović, 2001); they will serve to establish the methodology for interpreting the cognitive-spatial and behavioural-spatial responses of people with ID and students of Fashion and Architecture.

2. Planning for social inclusion in university spaces: research as a strategy

2.1. Motivation, hypothesis and objectives

The basic characteristics of the R&D Project "Inclusive Campus and Architecture" are summarized next. It should be emphasized that the underlying issue is the urban and architectural dimension of universities.

The overall context reflected a dual situation, subject to be improved. Firstly, the need to undertake dynamics of social inclusion in universities, with emphasis on ID. Secondly, foster innovative university spaces. The motivation arose from investigating those typologies (at 3 scales) that induce feelings of welcoming, based on the sensitivity of people with intellectual disability. The main hypothesis was that having welcoming environments favours the social inclusion of people with ID. And that, using their unique emotional characteristics, the criteria provided would improve the quality of university spaces for any user.

In terms of objectives, the first was to analyse antecedents: architectural typologies and characteristics of people with ID. The second was to face the challenge of including population groups with intellectual disability in universities, collecting responses to 3 questionnaires, using the sampling technique (Park, & Jung, 2009).

The third objective was to extract proactive readings from those responses. The fourth goal included an added derivative: a comparative study between the affective impressions of volunteers with ID and those provided by university students in two disciplines characterized by creativity and sensitivity to objects (architectural pieces and costumes), such as Fashion and Architecture. From the contrasting vision between the 3 population groups, a list of conclusions was generated.

2.2. Methodology: sampling profile

The methodology was based on the sample technique (Fricker, 2017), (Groves, Fowler, Couper, Lepkowski, Singer, & Tourangeau, 2011). It conditioned the design of three surveys, in "Forms" format. Each section contained several questions with multiple-choice answers, based on the Likert scale: "*Strongly Disagree-Disagree-Neither agree or Disagree-Agree-Strongly agree*" (Likert, 1932). Expert advice was used to design the questions, as the need to understand them had to be combined with a minimum of richness in the answers, to draw proactive conclusions about the planning of university spaces.

The reason for choosing this Lykert system was born from the nature of the groups surveyed. Mere affirmative or negation answers were not sought, but a more varied and nuanced cast, so that problems of comprehension or incoherence were avoided, especially in the group of people with intellectual disabilities. It should be noted that the type of questions and the options offered by the Lykert scale led to the compatibility of the understanding of what was asked with a certain conceptual density in the answers, since it was a Research Project.

A comparative study was conducted, which sought to transcend the results of the surveys completed by volunteers with ID. Emotional responses to the same spatial typologies contributed by university students were studied, and the results of the triad of sources were compared.

2.3. Basic contents of the surveys

The questions were ordered into 3 scales, corresponding to the urban and architectural dimensions of universities: campus, building and classroom, formulating 469 questions, which were designed according to the sampling profile, as described earlier. From all the questions, the following have been chosen for this article:

- a. Campus scale: Integration vs. Segregation; Limits and accesses; Singular Functions and Symbolic Role; Centripetism and Compositional Uniformity: Open Spaces of Intervention and Art
- b. Building scale: Distribution spaces and visual comprehension of elements of communication; Outer limits and types of accesses: Itineraries: composition and call effect; Chromaticism and spatial differentiation; Natural Stimuli & Art.
- c. Classroom scale: Texture in vertical planes and environmental implications; Three-dimensional composition; Formal composition and chromaticism in the furniture; Spatial appropriation, scale and sense of belonging; Overlapping stimuli of Nature and Art.

The population groups added were students from two creative disciplines with a creative imprint: Fashion and Architecture. Their choice is justified next. Since ancient times, Fashion and Architecture have been concerned with providing shelter and protection for the human body, sharing common “construction” materials, especially in their origins, since clothing and tents used animal skins. Both types of designs house a kind of spatial entity and have induced reciprocal influences. In terms of teaching innovation, the modality of “Project-Based Learning” enjoys a notorious prominence in both subjects.

2.4. Comparative study: Architecture, Fashion and creative sensitivity

The inclusion as part of the comparative study of Fashion and Architecture is now explained. First, these students are familiar with the sensitivity inherent in the experience of objects (Devetak, 2016). Their professional work will focus on designing elements that meet human needs, including the enjoyment of aesthetics (Ertas, & Samlioglu, 2015). Secondly, both disciplines share innovative spaces for singular pedagogical modalities, (Campos, & Luceño, 2018), (Crewe, 2008), (Luceño, & Rodríguez, 2022), (Yildiz, & Duzgun, 2014).

There is an added reason for the threefold comparison: creativity, understandable as an extraordinary potential of human beings (Guilford, 1980). Several works link ID with creative thinking (Lauronen, Veijola, Isohanni, Jones, Nieminen, & Isohanni, 2004); Fashion and Architecture also promote it (Casakin, Davidovitch, & Milgram, 2010). The present work explores how this quality arises in people with mild ID (borderline intelligence) and students of creative disciplines. The latter share a remarkable social sensitivity towards people with intellectual disability, as they have historically been concerned with solving human needs. The research process conducted tries to take advantage of creative impulses as a form of social inclusion. And relate the entire exhibition compared to the urban and architectural dimension, which is the basic thematic core of the research carried out.

3. Analysis of answers in the surveys

A comparative reading of the results of the triad of surveys will be carried out, grouping them into homogeneous sets, and using a common analysis structure: Partial typological-spatial theme / Emotional Responses: Analysis of results by population groups. A simple code will be used: People with Intellectual Disabilities: (ID); Fashion students (FS); Architecture students (AS).

3.1. Social Inclusion and Campus scale

3.1.a Partial typological-spatial theme - Integration vs segregation

Emotional Responses. -People with ID positively valued the fact that the campus is segregated from the urban fabric (80% said that this typology provides them with security and peace of mind). The FS and AS did so negatively (around 70% of Architecture and 80% of Fashion stated that this typology causes them insecurity), opting for the preference of campuses integrated into cities.

3.1.b Partial typological-spatial theme - Limits and accesses

Emotional Responses. -Regarding campus limits and access, most respondents (ID, FS, AS) expressed a positive reaction to the fact that the sets show a clear and closed edge. Specifically, the existence of a single entrance to the campus produced significantly different emotional responses, being valued more positively by people with ID, and little by AS (ID: 52%; FS: 42%; AS: 7%).

3.1.c Partial typological-spatial theme - Singular functions and symbolic role

Emotional Responses. -Most respondents (ID, FS, AS) expressed a positive reaction to the fact that campuses have a separate building for the library. As a specific information, it produced remarkably similar emotional responses, being an aspect that achieves a remarkably high degree of emotional satisfaction in all groups (ID: 88%; FS: 100%; AS: 95%).

3.1.d Partial typological-spatial theme - Centripetism and compositional uniformity

Emotional Responses. -A high percentage of respondents (ID) express positive emotional reactions to campuses with diversity in the composition of the different architectural pieces (85%). In the case of FS and AS, the responses reached similar values (92% and 78%, respectively). This percentage is significantly similar when answering the questions referring to the fact that buildings adopt a centripetal composition with respect to a central space (ID: 80%; FS: 80%; AS: 90%)

3.1.e Partial typological-spatial theme – Open Spaces of intervention and Art

Emotional Responses. -Most respondents (ID, FS, AS) expressed a completely positive reaction to the existence of gardens on campus (ID: 94%; FS: 100%; AS: 100%). As a feature associated with the relevance of open spaces of intervention, the presence of works of Art (especially sculptural pieces) within the ensemble is a factor that arouses positive emotional responses in the three groups surveyed (ID: 80%; AM: 80%; AA: 90%).

3.2. Social Inclusion and Building scale

3.2.a Typological-spatial partial theme - Spaces of distribution and visual comprehension of elements of communication

Emotional Responses. -In the majority percentage, ID, FS and AS recognize that accessing a distribution space and visually understanding the elements of communication (corridors or stairs) generates a positive feeling for them (ID: 86%, FS: 80%; AS: 95%). On the other hand, if these spaces are of considerable dimensions (in plan and height) this does not generate different extreme emotional impacts: in ID, 59% express that it causes them emotional discomfort or neutrality; in FS, 60%; in AS, 52%. In addition, casual meeting spaces are valued positively or neutrally by the three groups (ID: 89%; FS: 87%; AS: 100%).

3.2.b Typological-spatial partial theme - Outer limits and typology of accesses

Emotional Responses. -The existence of transparent or translucent vertical walls at the outer limit generates positive emotional responses (ID: 88%; FS: 87%; AS: 100%). In the case of internal divisions, transparency is valued in a quite different way, providing a sense of tranquillity in ID (70%) and AS (88%), but being the opposite in FS (33%). The ID group shows a certain inclination to negative feelings about the fact that a building has multiple entrances (57%); On the other hand, both FS (80%) and AS (94%) recognize that it does not generate negative impacts on them.

3.2.c Partial typological-spatial theme - Itineraries: composition and call effect

Emotional Responses. -Most respondents showed positive affective reactions if the corridors are performed by curved compositions and contain elements that break the monotony in development (such as corners or spatial pauses) (ID: 81%; FS: 80%; AS: 89%). If the itineraries have an element at the end of their route or at intermediate points that generates a call effect, this awakens positive feelings of curiosity and security in the respondents (ID: 77%; FS: 80%; AS: 95%). In the case of stairway landings, the emotional impact is assessed with greater positive intensity (ID: 88%; FS: 87%; AS: 97%).

3.2.d Partial typological-spatial theme – Chromaticism and spatial differentiation

Emotional Responses. -Both in itinerary spaces and in distribution spaces, the treatment of the planes with warm colours generates positive emotional impacts on all groups, expressed in terms of joyful moods (ID: 84%; FS: 80%; AS: 92%). In other terms of perceptions, the use of chromatic variety as a tool to differentiate spaces is highly valued by all respondents, reflecting practically identical percentages (ID: 87%; FS: 87%; AS: 87%).

3.2.e Typological-Spatial Partial Theme - Natural stimuli and Art

Emotional Responses. -The presence of natural elements within the architectural pieces generates positive emotional responses in all groups (ID: 86%; FS: 80%; AS: 92%). About the presence of works of Art, which are essentially pictorial, the respondents stated that it arouses very pleasant feelings in them (ID: 60%; FS: 87%; AS: 87%).

3.3. Social Inclusion and Classroom scale

3.3.a Typological-Spatial partial theme - Texture in vertical planes and environmental implications

Emotional Responses. -Enjoying natural lighting in the classroom generates highly positive emotional reactions in the three groups (ID: 96%; FS: 87%; AS: 94%). As a compositional and textural solution associated with the above, transparent vertical planes as limits are a factor on which these groups express different preferences; in ID 70-80% rate it positively, in FS: 40-50%; in AS: 60-70%. It should be added that the three groups affirm that transparent partitions contribute to creating pleasant environments for group work.

3.3.b Partial typological-spatial theme - Three-dimensional composition

Emotional Responses. -If the spatial composition of the classrooms is performed by a variation in the horizontal plane of the floor, generating platforms or steps, this is positively valued by the three groups, in terms of emotional well-being. This typology generates satisfaction for various activities, both those of relationship or quiet enjoyment of time and space, and very singularly those specifically academic, such as attention in class or group work. (ID: 60-70%; FS: 60-70%; AS: 60-70%). It is remarkable that in the case of AS, it is valued with intensity for times of relaxation

3.3.c Partial typological-spatial theme - Formal composition and chromaticism in furniture

Emotional Responses. -Depending on the type of arrangement within the classroom, the furniture generates different emotional reactions in the users. The centripetal disposition around the position of the teacher is valued differently by each group (ID: 74%); (FS: 44%); (AS: 54%). The orthogonal grid solution is the one that awakens the greatest sense of well-being and motivation for teaching activities, as it encourages attention in class (ID: 60-70%; FS: 70-80%; AS: 70-80%). In terms of chromaticism, having chairs and tables with varied colours is more positively appreciated in people with ID than in others (ID: 77%; FS: 56%; AS: 51%).

3.3.d Typological-Spatial partial theme - Spatial appropriation, scale and sense of belonging

Emotional Responses. -The dimensions of the classroom condition affective responses, collaborating in the case of smaller scales to make the user feel more welcome and a feeling of belonging (ID: 65%; FS: 81%; AS: 63%). Having individual lockers or lockers is a fact highly valued by the three groups (ID: 85%; FS: 81%; AS: 63%).

3.3.e Partial typological-spatial theme - Overlapping stimuli of Nature and Art

Emotional Responses. -The existence of natural elements in classrooms motivates positive emotional responses in the three groups (ID: 76%; FS: 81%; AS: 94%), which is proportional to what is manifested in the buildings. Regarding works of Art, their presence generates pleasant feelings in them, preferring to have them as part of the interior space (ID: 80%; FS: 100%; AS: 63%).

4. Results of the research carried out

To explain the transcendent chapter of results, a specific system is used, summarized below. Again, it is necessary to justify that all of them are directly related to the urban and architectural dimension of universities, since that is the core issue of the research, and of this text.

- A Typological-spatial partial theme
- B Cognitive and behavioural interpretation (of affective responses to spatial typologies, based on Piaget theories)
 - B.1 Typological-spatial properties. -It affects the quantitative, dimensional and geometric features of each typology, and the way in which they are passively perceived. It is related to the category of "Euclidean space", assuming it as a physical container in which angles, measurements, surfaces or sizes can be identified.

- B.2 Cognitive-spatial response. -It refers to the more qualitative characteristics of each typology, and the way in which they are passively but subjectively perceived. It is related to the modality of "topological space", assuming it as a place in which an understanding of order, enclosure or continuity is accessed, and the cognitive perception of the variation of spaces in sequence, among other features. Among the environmental factors that influence this cognitive response, it should be noted that it can generate feelings of warmth, care, shelter, perspective mastery, or topophilia.
- B.3 Behavioural-spatial response. -It affects the properties of the different spatial typologies that are likely to induce behaviours, because of the user's active interpretation. It is related to the category of "projective space", assuming it as a personalized environment, where the point of view and the voluntary variations of the lived experience and variation of points of view are influential. This dynamic of internalization induces emotional responses and an appetite to conduct certain actions linked to the awareness of space, such as walking, moving and exploring the environment. It involves emotional and bodily intentionality.

4.1. Results. Cognitive and behavioural interpretation of affective responses to spatial typologies (Campus Scale)

4.1.1 Integration vs segregation

A.-Partial typological-spatial theme - Integration vs segregation

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. - Campuses are usually complexes with an urban profile characterized by considerable dimensions and irregular contour geometries. If they are in segregated territorial environments, they project an image of formal autonomy, making their perception from the outside clearer.
- B.2 Cognitive-spatial response. -The most notable affective impact on the 2 groups of students surveyed (FS and AS) is that integrated campuses generate a greater sense of well-being. This basically alludes to topological space, because it is understood that cognitive proximity is valued, and the fact that the enclosure is closed. It is noteworthy that the groups with ID differ in this response, as they appreciate more the clarity and compactness of the urban planning, and the feeling of security and tranquillity that derives from the closure of the teaching complex.
- B.3 Behavioural-spatial response. -People with ID need to orient themselves and easily perceive the location of the campus, for which the existence of a clear and recognizable limit induces a greater appetite to enter and experience it as a safe environment, which is linked to the essential characteristics of the "projective space". Perhaps the FS need more than the university environments to establish synergies with the city (specific cases can be cited, such as academic catwalks, fashion shows, or professional shops and workshops); this generates intentions of an emotional and corporal nature (Luceño, & Campos, 2021). As for the AS, the desire to explore the city stems from its status as a provider of Art and Culture, as well as facilities of all profiles.

4.1.2 Limits and accesses

A.-Partial typological-spatial theme - Limits and accesses

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -If the campuses have a clear formal configuration of their limits, this leads to more unitary perceptions, as well as the fact that they have a main entrance of contrasting dimensions.
- B.2 Cognitive-spatial response. -Cognitive-spatial responses reflect disparate results. FS may prefer multiple entrances due to the tendency to generate multiple urban synergies, which could have their spatial translation in several entrances, as a sign of a vocation for openness. This same preference is observed in the AS, which can be explained by the fact that their technical knowledge makes them value a variety of typological solutions, accessibility and route in urban areas. ID opt for a prominent main entrance, as they need to orient themselves from the outside, and a single access point acquires remarkable perceptual and emotional effectiveness.

Conversely, verifying the existence of such an exit nucleus helps them feel safe, given their fragile condition.

- B.3 Behavioural-spatial response. -The existence of clear limits induces permanence behaviours derived from the feeling of welcome, especially in population groups with ID. In the case of university campuses (FS and AS), the dissolution of boundaries suggests an appetite for communication and functional and experiential overlap with environments, especially if they are dominated by consolidated urban areas, and even more so if they have added heritage and cultural qualities (Campesino, & Salcedo, 2014).

4.1.3 Singular functions and symbolic role

A.-Partial typological-spatial theme - Singular functions and symbolic role

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -The most symbolic function on campuses is that associated with the "Deposit of Knowledge". Libraries are often of considerable size, occupying strategic locations, perceptible from many angles of the premises. There are outstanding examples worldwide, as the symbolic library of the National Autonomous University of Mexico (UNAM), designed in 1950 by O'Gorman, Saavedra and Martínez (see Figure 1)
- B.2 Cognitive-spatial response. -Libraries or Learning and Research Resource Centres (LRRC) buildings play a functional role that is highly valued by all members of the university community (ID, FS, AS). When they are performed through free-standing architectural pieces, the symbolic role they play is reinforced, while at the same time they can function as visual landmarks in the campus landscape, facilitating orientation and serving as experiential nuclei. In addition, their constructed language sometimes serves as a support for cultural expression (González, 2004).
- B.3 Behavioural-spatial response. -People with ID and students (FS, AS) feel a special attraction for entering and using libraries or LRRC, both for study or research activities, as well as for social learning and group work. If they are configured as autonomous pieces, behavioural responses are generated that lead to an increase in the frequency of their daily use.

Figure 1. Library – UNAM Campus (Mexico)



Source: authors.

4.1.4 Centripetism and compositional uniformity

A.-Partial typological-spatial theme - Centripetism and compositional uniformity

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -The urban structures of the campuses are ordered by means of different geometries, presenting homogeneous or heterogeneous languages. The internal order often presents an open space that acts as the central nucleus of experience. The passive perception inside is truly clear, as the architectural pieces are organized in a formal arrangement based on angular orientations that are easy to understand globally. Amongst the numerous examples of centripetism in international campuses, it is quite exemplary the small case of the group of buildings at the School of Economics and Business located in the Bežigrad Campus of the University of Ljubljana in Slovenia (See Figure 2).
- B.2 Cognitive-spatial response. -It is notorious that the urban planning of architectural pieces with typological diversity and organized around a central nucleus as a place of interaction generates positive feelings in all the members of the university community surveyed (ID, FS, AS). Consequently, in terms of "topological space", it seems to be convenient to have built volumes organized around a central animated void, and that their respective resolutions reflect a diversity that makes them achieve the social metaphor of "unity within diversity" (Samonà, 1975).
- B.3 Behavioural-spatial response. -The organization of a university campus around a pedestrian interstitial area induces an appetite to access it, to place oneself in the centre to enjoy a panoptic perception, while at the same time awakening an interest in the exploration of disparity in architectural pieces. This is related to the projective meaning of space.

Figure 2. Campus Bežigrad- University of Ljubljana (Slovenia)



Source: authors.

4.1.5 Open spaces of intervention and Art

A.-Partial typological-spatial theme - Open spaces of intervention and Art

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -From the point of view of "Euclidean space", the landscaped areas on campuses tend to have variable dimensions, depending on whether they play a nuclear role or are ascribed to the architectural pieces. If they function as receptacles for artistic manifestations (usually sculptural pieces), they are

usually proportionate in size to the surface dimensions of the open space. The University of Vigo has a small but quite relevant campus in the town of Pontevedra, where the presence of natural open spaces by the Lérez River offers an attractive university landscape (See Figure 3).

- B.2 Cognitive-spatial response. -Open spaces of intervention (gardens) are evocative of domesticity and generate emotional well-being in all users of university complexes. In addition, the presence of works of Art is also highly valued, from which it can be deduced that there is a positive impact on visual thinking, as well as the added formative role that their presence contributes to the reality of the campuses (Moraza, &Cuesta, 2010).
- B.3 Behavioural-spatial response. -Social relations find a framework in designed open spaces (gardens) that promote their dynamism, as well as in places with a natural landscape component. The presence of Art generates attitudes that foster cognitive integration, inviting the user to learn by discovery, encouraging a greater commitment to heritage sensitivity, completing the work through their own experience of it.

Figure 3. University of Vigo - Pontevedra Campus (Spain)



Source: authors.

4.2. Results. Cognitive and behavioural interpretation of affective responses to spatial typologies (Building Scale)

4.2.1 Distribution spaces and visual comprehension of elements of communication

A.-Typological-spatial partial theme – Distribution spaces and visual comprehension of elements of communication

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -The areas of entrance and distribution tend to have considerable dimensions in terms of "Euclidean space", compared to others that are more fragmented within the university building. Due to their nature as reception hubs and origin of communication routes, they often resort to centralized geometric solutions, where interior sections converge with different angles and measurements. The Italian Politecnico di Milano building which hosts the School of Architecture has a big nuclear hall, where the elements of communication are clearly perceived (See Figure 4).

- B.2 Cognitive-spatial response. -The visual domain enjoyed from the distribution spaces can encompass the visualization of communication elements, which are essentially made up of corridors and stairs (Liang, & Huang, 2021). This fosters a more unitary, functional and simultaneous reading of the way the architectural piece is experienced, which is related to the "topological space". If the dimensions of these spaces are large, this does not seem to constitute a factor of emotional acceptance or rejection, although the three groups surveyed chose to express that they feel some unease. It is worth adding the marked positive impact of open spaces for casual encounters and human interaction, as places that activate social relationships, which is seen with great intensity in the case of ID. Finally, it should be noted that in FS and AS, large lobbies are frequent, as they usually host exhibitions of works, either by professionals or by the students themselves.
- B.3 Behavioural-spatial response. -The prominent existence of spaces of distribution located in the core areas of the architectural piece encourages intense use, both for the dynamics of internal movement and to promote social relations within it. The visualization of communication elements leads to greater efficiency in accessing them, increasing agility in daily functionality.

Figure 4: Faculty of Architecture - Politecnico di Milano (Italy)



Source: authors.

4.2.2 Outer limits and typology of accesses

A.-Typological-spatial partial theme - Outer limits and typology of accesses

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -When architectural pieces have a clear configuration of their perimeter limits; this leads to more unitary perceptions. This is also recognizable when they have a main entrance of prominent size and location, which has the meaning of "Euclidean space".
- B.2 Cognitive-spatial response. -The number and type of access to an architectural piece influences the emotional impact. In the case of people with ID, they negatively value the absence of an easily recognizable main entrance, probably due to the feeling of diminished psychological security that not having it can produce, which would help them to orient themselves properly both to enter or exit. Transparency in exterior walls is a highly valued factor, as it involves the entry of light and a visual domain over the context (Bentinck, van Oel, & van Dorst, 2020).

As far as interiors are concerned, it is positively valued by ID and AS but not by FS; perhaps the latter is due to the fact that in many classrooms they are creating their designs, and these have considerable dimensions (on the scale of the human body), which they want to preserve with privacy (AS generate designs of smaller dimension on the board).

- B.3 Behavioural-spatial response. -In terms of "projective space", it can be noted that the walls treated with the intention of visual transparency facilitate the recognition of the building's use, generating a sensation of non-concealment from the outside. At the same time, they favour a greater perspective domain, as the environment is visualized. The latter increases the appetite to go beyond the physical domains and experience the adjacent areas of the campus, to which is added the feeling of non-hiding from the outside and the visual enjoyment of the environment. Hierarchical access also favours behavioural responses of greater frequency and agility in the daily experience of the environment.

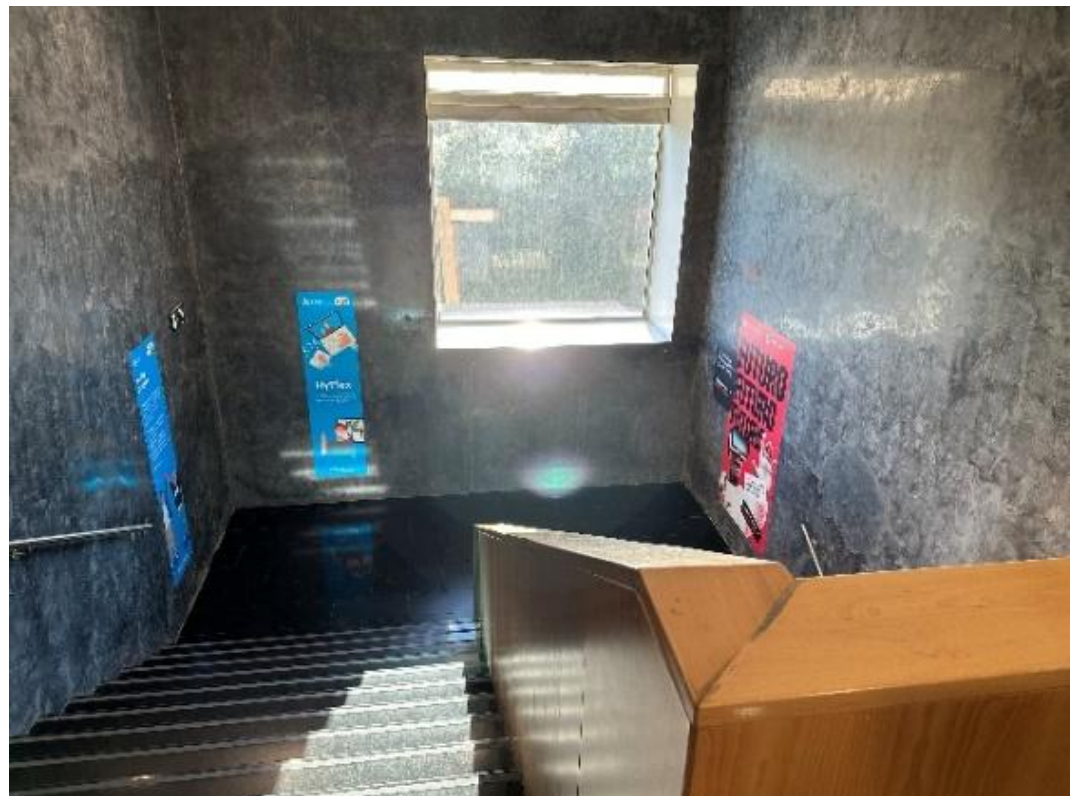
4.2.3 Itineraries: composition and call effect

A.-Partial typological-spatial theme - Itineraries: composition and call effect

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -In terms of "Euclidean space", the formal composition of the itineraries is performed following linear configuration models, straight or curved, with variable width dimensions depending on the user flows. The stairs usually have double sections, with one or more landings, preferably located on the exterior walls of the architectural piece. The Universidad San Pablo-CEU has a large staircase inside its Polytechnic School, which has a big opening that offers an attractive wide view over the surrounding natural environment of the Montepríncipe campus (See Figure 5).

Figure 5: Montepríncipe Campus – University San Pablo-CEU (Spain)



Source: authors.

- B.2 Cognitive-spatial response. -If the horizontal communication itineraries (corridors) have a singular element at their end (openings, singular spatial final or works of Art), so that it creates a call effect in the users, this generates a highly positive cognitive-spatial response, as expressed by the 3 population groups (ID, FS, AS). The existence of windows at the end of the corridors is particularly appreciated. But it is singularly relevant that it is done with greater intensity when it comes to those types of visual openings to the outside located on landings of stairs.

This compositional resolution refers to the pleasant sensation of momentary visual projection that accompanies vertical displacements, as well as an awareness of the presence of the environment and the entry of natural light (Kaplan, 2001).

- B.3 Behavioural-spatial response. -As far as it affects the "projective space", the knock-on effect created by the existence of openings or other singular elements in stairs or corridors favours the appetite for experimentation. At the same time, the consequent increase in the time of use of these spaces induces them to mutate from a mere condition of transition space to a place of social learning.

4.2.4 Chromaticism and spatial differentiation

A.-Partial typological-spatial theme - Chromaticism and spatial differentiation

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -The interior spaces of a university building are designed because of a compositional process, which arranges them according to guidelines aimed at their effectiveness and correct compliance with interactions with common elements. The dimensions of each of them vary depending on the activity to be hosted, as well as the geometric resolution of the interactions.
- B.2 Cognitive-spatial response. -The use of colour in the internal areas of architectural pieces, especially those with a warm tone, is positively valued as a resource that induces positive emotional sensations, as it contributes to creating environments of spatial welcome that accompany the human (Heller, 2004).

This is valued by ID, FS and AS especially in distribution elements. It is also found that the three population groups opt for the preference of chromatic variety as a resource to differentiate spaces. It should be added that furniture can contribute as an added contribution.

- B.3 Behavioural-spatial response. -The chromatic variety contributes to distinguishing spaces, which generates a simpler and more direct perception and experience of them, and the consequent more direct reading of functional divisions or differentiations. When the reception or distribution areas are resolved with warm tones, the feeling of spatial welcome is reinforced, favouring an appetite to remain in them.

4.2.5 Natural stimuli and Art

A.-Partial typological-spatial theme - Natural stimuli and Art

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -The presence of natural elements, in the form of vegetation, as well as works of Art in the interior of architectural pieces is usually performed in terms of complementary elements. They usually have dimensions and locations subordinated to the geometry and size of the spaces they complement, so that their relative proportion is adequate to generate an adequate perception.
- B.2 Cognitive-spatial response. -The presence of natural elements and vegetation in the interior areas of buildings generates feelings of well-being, which is consistent with the continuity of what Nature is valued also in the exterior areas of the campus (Brymer, Cuddihy, & Sharma-Brymer, 2010).

As for the existence of pictorial works of Art, or quality photographs, it is highly valued as a resource that provides additional formation to the usual teaching activities, activating the consequent topophilia. The fact that higher levels of well-being are reached in FS and AS than in ID may be due to the creative nature of Fashion and Architecture, and to the conceptual closeness that Art has with respect to the profile of both disciplines.

- B.3 Behavioural-spatial response. -In a similar way to what is observed on the campus scale, the presence of Nature and Art inside the architectural pieces encourages a greater frequency of experimentation with the spaces where they are located. They induce users to put into practice in their daily lives a learning by discovering the morphological and aesthetic qualities of both presences, thus increasing cognitive integration.

4.3. Results. Cognitive and behavioural interpretation of affective responses to spatial typologies (Classroom Scale)

4.3.1 Texture in vertical planes and environmental implications

A.-Partial typological-spatial theme - Texture in vertical planes and environmental implications

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -An approach to the vertical planes of the classroom in terms of "Euclidean space" reflects that its dimensional configuration is conditioned by the free height, as well as by its surface and plan measurements, with the frequent use of orthogonal geometry in the three-dimensional composition. Amongst many international examples where special textures are used in classroom walls (transparency), it is remarkable the solutions present at the central building of Nottingham Trent University (See Figure 6).
- B.2 Cognitive-spatial response. -Transparency in vertical planes that function as limits in classrooms is an increasingly present trend in teaching environments (Benade, 2020). It provides environments with abundant access to natural light, a quality highly preferred by users. In another order affecting the "topological space", this type of planes generate positive responses, from a perceptual-experiential approach; the fact that FS do not value it as much as ID and AS may be due to a reason already pointed out earlier: the preference to preserve the intimacy of their creations, characterized by having considerable dimensions (on the scale of the human body).

B.3 Behavioural-spatial response. -In terms of "projective space", transparency in classrooms leads to a greater visualization of the immediate environment, as well as an increase in the appetite to go beyond conventional physical domains. It also awakens a positive feeling of non-concealment from the outside, and the consequent visual enjoyment of the context.

Figure 6: Central building – Nottingham Trent University (UK)



Source: authors.

4.3.2 Three-dimensional composition

A.-Partial Typological-Spatial Theme - Three-dimensional composition

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -Understanding the classroom as a three-dimensional space implies considering its quantitative and geometric features. It is a physical container that is normally configured by regular geometries and orthogonal angles, its measurements being a factor derived from the functional size associated with the number of users in each case. This compositional solution is not very common, but the campus of KTH University has some interesting examples (See Figure 7).
- B.2 Cognitive-spatial response. -The variation of the horizontal plane of the floor, either in the form of conventional stands or sectoral platforms that are emerging nowadays on the university scenario, generates positive emotional sensations. One of the reasons that may justify this preference lies in the fact that users understand the classroom as a dynamic place, pedagogically, which has its consequent spatial translation (Hertzberger, 2008). Possibly the AS group appreciates them more because this three-dimensional vibration is more attractive to be enjoyed passively, and more akin to the ideation criteria that are part of the architect's work.
- B.3 Behavioural-spatial response. -If variations are established in the composition of the classroom space in the horizontal plane of the floor, the resulting platforms generate in the users a greater appetite to explore the various areas, adding the possibility of thematizing the different sectors. In addition, it fosters a unitary perception of the classroom space, and a visualization of the various options for internal movement.

Figure 7: Central campus – KTH University (Sweden)



Source: authors.

4.3.3 Formal composition and chromaticism in furniture

A.-Partial typological-spatial theme - Formal composition and chromaticism in furniture

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -The classroom is characterized by being a physical environment whose limits define its essential condition as an architectural container for teaching activities. In this function, the formal composition of the furniture, its occupation of the usable area, as well as its morphological and chromatic characteristics, intervene decisively in the configuration of the overall typology.
- B.2 Cognitive-spatial response. -The arrangement and material features of the furniture within the classroom condition the emotional responses of the users, constituting a factor of great relevance for the motivation and adoption of participatory

behaviours, in addition to reinforcing the corresponding pedagogical models (Fajardo, Higuera-Trujillo, & Llinares, 2023). From the analysis of the results, it can be deduced that the orthogonal grid arrangement is valued in a similar way as the central pattern, since both promote attention in class. About chromatic diversity in chairs and tables, it may generate more positive emotional impacts on people with ID because they need more intense and varied visual stimuli, which affect their motivation and daily enjoyment.

- B.3 Behavioural-spatial response. -The variation in the spatial composition of the furniture inside the classroom leads to behaviours of willingness to change. This is due to the mobility of its elements, which is more agile with horizontal floors. The variety of colours in these elements awakens a kind of visual fun associated with chromaticism.

4.3.4 Spatial appropriation, scale and feeling of belonging

A.-Partial typological-spatial theme - Spatial appropriation, scale and feeling of belonging

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -The physical dimensions of classrooms, associated with their compositional patterns, define its nature as material containers their teaching activities. These dimensions are performed by means of coherence guidelines between the general size, the floor area and the free height, making it possible to place functional emphasis on certain partial sectors.
- B.2 Cognitive-spatial response. -It has been found that the physical scale of classrooms affects the emotional responses of the three population groups, with the smaller ones being the most appreciated. This feature is related to the psychological appropriation of space, and the feeling of belonging associated with it (Black-Hawkins, Maguire, & Kershner, 2022). The existence of individual lockers also contributes to the latter, which function as elements that awaken a sense of personal connection with the place. It is worth reflecting on the fact that small classrooms are especially valued by FS, an issue linked to the desire for intimacy that characterizes their design work on the costume, as an object associated with the human body.
- B.3 Behavioural-spatial response. -The spatial emphasis on the smaller-scale areas of the classroom, such as corners, awakens in users the desire to explore them, especially if they are thematized. It can also generate an increase in the frequency of use of the classroom environment, conducting stays or activities beyond those strictly for teaching.

4.3.5 Superimposed stimuli of Nature and Art

A.-Partial typological-spatial theme - Superimposed stimuli of Nature and Art

B.-Cognitive and behavioural interpretation

- B.1 Typological-spatial properties. -Analysing it in terms of "Euclidean space", the existence of natural elements or works of Art inside the classrooms is configured according to their condition as complementary factors to the global environment in each case. Due to their essential nature, they are usually defined by sizes and locations subordinated to the geometry and physical features of the areas they complement. Some international examples are exemplary in the presence of works of Art inside classrooms; such is the case of the Fashion learning spaces and ateliers at the CSDMM (Polytechnic University of Madrid) (See Figure 8).
- B.2 Cognitive-spatial response. -The existence of natural elements, such as plants or flowers, in the classroom generates emotionally pleasurable sensations; this is consistent with the favourable assessment of Nature also in the internal areas of the building, and outside the campus. In relation to sculptural, pictorial works of Art, or artistic profile photographs, their presence is also valued very positively as a resource that provides additional training, especially in the case of FS (Menninger, 2011).
- B.3 Behavioural-spatial response. -If the classroom sees its interior enriched with elements from Nature or Art, an increase in social relations is induced in this type of space, as it is within a place that provides cognitive enrichment, both as a context and as a theme. Likewise, a greater curiosity is awakened by the discovery of morphological and artistic qualities, which reinforces the use of the classroom as a tool for complementary formation.

Figure 8: CSDMM – Polytechnic University of Madrid (Spain)



Source: authors.

5. Conclusions and proactive approaches: towards innovation in the planning of university spaces

To draw conclusions with a global profile, it is necessary to stress again the urban and architectural dimension that permeates both the research carried out and the present text. Having said this, it is appropriate to go back to the definition of "socio-spatial schema" established by Terence Lee, as a mental representation that includes sensory, cognitive and dispositional data, which allows human beings to relate to the surrounding environment (Lee, 1976). According to Lee, behaviour-environment interaction is bidirectional, but it gives more importance to the way in which the environment induces attitudes, rather than the other way around (that is the architect's task).

This ultimately generates an identity of place: experiences of person-place interaction, broken down into two: individual experience and social experience. Therefore, the conception of physical spaces in universities is a matter of transcendental relevance, as they are called to influence the mood of those who use them. As a singular case, the benefit of outdoor spaces to educational buildings should be remarked, as recent studies have highlighted (Krajnović, & Roth-Čerina, 2023). To conduct the aforementioned task, it has been demonstrated with the research carried out that having the perceptual-emotional sensitivity of people with ID is an undoubted value. In fact, it has been proven throughout the development of the R&D Project "Inclusive Campuses" that fostering fully inclusive work, people with ID help others. and that the qualitative criteria they have provided through the emotional impact of the different spatial typologies can improve university environments, for any type of user. This means that the quality of those built premises would increase.

As a recent example, the planning of a new campus in Angola took some outcomes of the research carried out to define its spaces (Campos, 2023). When it is aspired that urban and architectural design reaches levels of suitability, all those strategies that, based on research, provide criteria of formal composition that effectively contribute to this mission are welcome. Such has been the case with the R&D Project, the results of which feed this text.

For all these reasons, the proactive approaches that have emerged from the research dynamics are classified in the various themes that have nourished the surveys. The recommendations for planning university spaces, in terms of innovation, can be put together from a simple extraction and generalization of the themes described in sections 4.1, 4.2 and 4.3, relating to the 3 scales: campus, building and classroom.

To conclude all the above, it is pertinent to say that both Architecture and Fashion students share a characteristic of remarkable value with people with ID: that they undertake the tasks inherent to their Teaching/Learning processes from emotion and sensitivity, as both are disciplines with a creative profile, whose purpose is to generate various types of well-being for human beings.

A simple final reflection must be added, with the aim of underlining the philosophy that has inspired this text, and the R&D Project from which it is born. The social inclusion of groups with ID is a mission based on the ideals of justice and equality, one of the results of which is the reinforcement of human dignity. Improving university spaces is a procedure that must be added to mitigating disability, understood not as a problem of the individual, but of what exists in their relationship with the environment. And that the construction of this environment in universities (the campus, the building and the classroom) is a matter to be solved from the urban and architectural design, reinforcing the human scale in university premises (Campos, 2019).

Finally, a circumstance of great relevance must be highlighted: through the research carried out, it has been shown that people with ID have an enormous potential to inspire and help any group, by contributing their high doses of sensitivity. Conversely, students in both disciplines can achieve their technical skills by relying on the inspiration provided by the human relationships they have shared with these people: achieving formation through feelings.

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7. Authorship

The authors contributed equally to this work.

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